

REMARKS/ARGUMENTS

Claims 1-26 are pending in the application.

The Examiner's indication that Claims 5, 8-13 and 18-20 would be allowable if rewritten in independent form is acknowledged with appreciation.

Claims 1-4, 6, 7, 14-17 and 21-26 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Applicants' admitted prior art in view of Cunningham '427. Applicants respectfully traverse this rejection.

Independent Claim 1 recites a perpendicular magnetic recording system comprising a perpendicular magnetic recording disk including magnetic recording tracks, a perpendicular magnetic recording head including a perpendicular write pole movable in an arc across the perpendicular magnetic recording disk, and means for sequentially writing with the write pole onto adjacent magnetic recording tracks of the perpendicular magnetic recording disk to thereby substantially eliminate a skew angle effect. Claim 1 is thus a means-plus-function claim pursuant to 35 U.S.C. § 112, paragraph six.

Independent Claim 14, as amended, recites a perpendicular magnetic recording system comprising a perpendicular magnetic recording disk including magnetic recording tracks, and a perpendicular magnetic recording head including a perpendicular write pole movable in an arc across the perpendicular magnetic recording disk, wherein the perpendicular write pole has a trailing edge and a side edge, the side edge is aligned at compensation angles with respect to the magnetic recording tracks, and the compensation angles remain greater than or equal to zero degrees when the write pole writes onto the magnetic recording tracks as the write pole moves in the arc across the magnetic recording tracks. Basis for the amended language of Claim 14 is provided in the specification, for example, at page 5, line 14 to page 7, line 24. Figs. 3-4 illustrate a write pole (12) with a trailing edge (12a) and side edges (12b and 12c). Figs. 4-7 illustrate compensation angles (A) which are measured from a plane parallel with the side edges.

Independent Claim 25 recites a method of magnetically recording data, the method comprising providing a perpendicular magnetic recording disk including magnetic recording tracks, providing a perpendicular magnetic recording head including a perpendicular write pole movable in an arc across the perpendicular magnetic recording

disk, and a step for sequentially writing with the write pole onto adjacent magnetic recording tracks of the perpendicular magnetic recording disk to thereby substantially eliminate a skew angle effect. Claim 25 is thus a step-plus-function claim pursuant to 35 U.S.C. § 112, paragraph six.

The combinations of features recited in independent Claims 1, 14 and 25 are not taught or suggested by the prior art of record.

Cunningham '427 discloses magnetic recording systems for floppy disks and hard disks in which the recording heads include a skewed gap. Fig. 1 of Cunningham '427 illustrates a floppy disk drive, while Fig. 2 illustrates a hard disk drive. In each case, the recording head includes a gap that generates a longitudinal magnetic field in the underlying magnetic disk during writing operations. As opposed to conventional longitudinal magnetic recording designs, the recording systems of Cunningham '427 include gaps that are skewed with respect to the tracks of the underlying recording disks. According to Cunningham '427, the provision of a skewed gap reduces the recorded track width as the head moves radially outward across the disk. Cunningham '427 teaches that such a skewed gap arrangement provides higher track density at the disk's outer tracks.

While the gaps of Cunningham '427 are skewed, the side edges of the write poles are parallel with the tracks of the underlying recording media. As shown in Fig. 2 and disclosed at column 3, lines 50-58 of Cunningham '427, the side rails of the slider are substantially parallel with the tracks of the recording disk, i.e., perpendicular to the disk radius.

The presently claimed perpendicular recording systems include a perpendicular magnetic recording head with a write pole that does not rely on any type of gap between opposing poles to write on a magnetic recording disk. Instead, the presently claimed perpendicular magnetic recording systems include a write pole that writes on a magnetic recording medium by inducing a magnetic field perpendicularly through a magnetic recording layer of the recording medium. An example of a perpendicular recording head which induces a perpendicular magnetic field through a recording medium is shown in Fig. 2 of the present application. As can be seen, the perpendicular recording head has no gap as found in longitudinal recording heads.

As noted previously by Applicants, one skilled in the art would not reasonably consider modifying a conventional perpendicular magnetic recording head as described in Applicants' specification to provide a longitudinal gap as found in longitudinal recording heads. Conventional perpendicular recording heads have no such gap, and one skilled in the art would not be led by the teachings of Cunningham '427 to provide any type of gap in a perpendicular recording head. Moreover, one skilled in the art would not be led by the teachings of Cunningham '427 to provide a skewed gap in a perpendicular recording head. It is therefore submitted that the prior art of record does not teach or suggest the presently claimed invention.

Moreover, with respect to independent Claim 1, the combination of Applicants' admitted prior art with Cunningham '427 proposed in the Office Action fails to render obvious a perpendicular magnetic recording system including means for sequentially writing with the write pole onto to adjacent magnetic recording tracks of a perpendicular magnetic recording disk to thereby substantially eliminate a skew angle effect. The prior art of record fails to recognize the problem of a skew angle effect in perpendicular magnetic recording systems, and further fails to teach or suggest any type of means for eliminating such a skew angle effect. Accordingly, Claim 1 is patentable over the prior art of record.

With respect to independent Claim 14, the combination of Applicants' admitted prior art with Cunningham '427 proposed in the Office Action fails to render obvious a perpendicular magnetic recording system including a perpendicular write pole having a trailing edge and a side edge, wherein the side edge is aligned at compensation angles with respect to magnetic recording tracks, which remain greater than or equal to zero. At column 3, lines 50-58, Cunningham '427 states:

... in accordance with this feature of the invention, the slider is of generally parallelogram shape. With this construction and arrangement, the head gap can be skewed relative the disk radius, as is required by the invention. However, the rails of the slider remain positioned in the conventional manner (i.e. generally perpendicular to the disk radius), and the flying characteristics of the head are not disturbed.

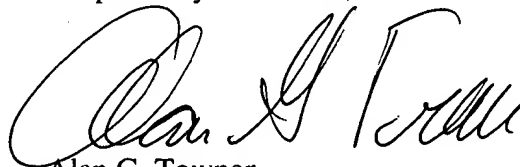
Nowhere does the prior art of record teach or suggest a side edge of a write pole aligned at compensation angles, nor that such compensation angles remain greater than or equal to zero degrees when the write pole writes onto the magnetic recording tracks as the write pole moves in an arc across the magnetic recording tracks. Claim 14 is therefore patentable over the prior art of record.

With respect to independent Claim 25, the combination of Applicants' admitted prior art with Cunningham '427 proposed in the Office Action fails to teach or suggest a method of magnetically recording data including a step for sequentially writing with a write pole of a perpendicular magnetic recording head onto adjacent magnetic recording tracks of a perpendicular magnetic recording disk to thereby substantially eliminate a skew angle effect. The prior art of record fails to recognize the problem of a skew angle effect of a perpendicular write pole, and further fails to provide a step for eliminating such a skew angle effect. Accordingly, Claim 25 is patentable over the prior art of record.

In view of the foregoing remarks, it is submitted that Claims 1-26 are patentable over the prior art of record. Accordingly, an early Notice of Allowance of this application is respectfully requested.

In the event that any outstanding matters remain in connection with this application, the Examiner is invited to telephone the undersigned at (412) 263-4340 to discuss such matters.

Respectfully submitted,



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